PATENT ABSTRACTS OF JAPAN

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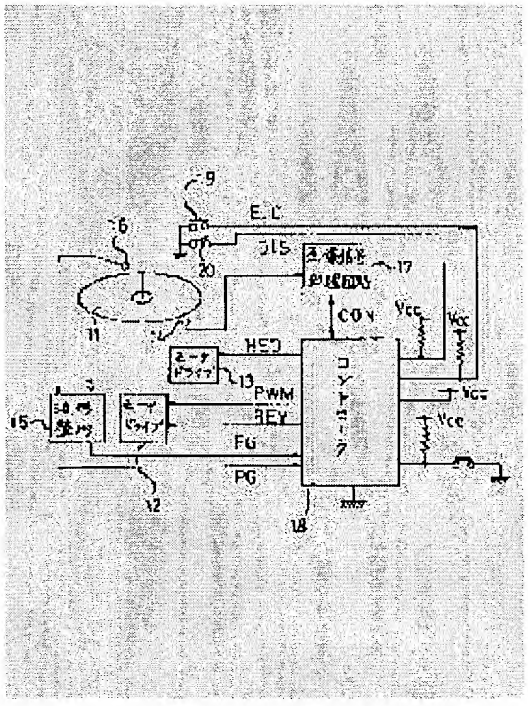
(54) INFORMATION RECORDING AND REPRODUCING DEVICE

(57)Abstract:

PURPOSE: To abruptly brake a motor by detecting a recording medium and continuously reversing the motor up to a specific speed, and intermittently repeating normal rotation and reversing thereafter.

CONSTITUTION: A controller 18 inputs and processes a PG signal and an FG signal and outputs a control signal to motor driving circuits 12 and 13 and a signal processing circuit 17. Further, the controller 18 inputs a reversing signal to the circuit 12 if ejecting operation is performed during the rotation of the magnetic disk 11. A head driving pulse signal is outputted to the circuit 13 and a control signal is outputted to the circuit 17. In response to the ejecting operation, the pulse driving signal is restricted to constant pulse width and a reversing signal is inputted to the circuit 17, so that the motor can be braked. Then the rotating speed of the recording medium is detected from the FG signal, and the reversing signal is continuously generated up to a predetermined speed reduction point, intermitted at the speed reduction point, and then stopped thereafter to perform brake control. Then the motor can abruptly be braked.



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CLAIMS

[Claim(s)]
[Claim 1] In the information record regenerative apparatus equipped with the mechanical discharge device in which record media, such as a magnetic disk recorded or played in the stowed position, are made to discharge by ejection actuation A control means to input the pulse driving signal which carried out Pulse Density Modulation to the motor drive circuit turning around a record medium according to FG signal, and to carry out forward rotation of the record medium, A brake means to make an inversion signal input into the above-mentioned motor drive circuit while making the ejection actuation performed during rotation of a record medium follow and regulating the above-mentioned pulse driving signal to fixed pulse width, Detect the rotational speed of a record medium from FG signal, and an inversion signal is made to continue till the 1st moderation point in time defined beforehand. The information record regenerative apparatus characterized by having the brake control means which makes an inversion signal intermittent by the progress at the 1st moderation time, and stops the input of this inversion signal with a pulse driving signal after that.
[Claim 2] The information record regenerative apparatus according to claim 1 characterized by establishing an adjustment means to detect supply voltage level, to **** in this disregard level, to regulate the pulse width of a pulse driving signal, and to adjust a braking time.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the information record regenerative apparatus which uses a magnetic disk, an optical disk, etc. as a record medium, for example, the image recording regenerative apparatus used for an electronic "still" camera.
[0002]
[Description of the Prior Art] Although the 2 inches small magnetic disk is used in the electronic "still" camera, generally, in a package, the interior of the rotation of such a magnetic disk is made free, and it is used as a disk pack.
[0003] Moreover, an electronic "still" camera is equipped with video floppy disk drive equipment (henceforth VFDD), and has composition which inserts a magnetic disk with predetermined supplies-of-provisions opening, and sets it.
[0004] If a magnetic disk is inserted, this magnetic disk will be held with an electrode holder, and, specifically, will be drawn along the supplies-of-provisions direction. Then, an electrode holder moves in the direction which intersects perpendicularly with the drawing-in direction with a magnetic disk, carries out the chuck of the hub of a magnetic disk to the turntable of a spindle motor, and sets a magnetic disk to the stowed position of record playback.
[0005] The electrode holder with which discharge of a magnetic disk held the magnetic disk according to ejection actuation moves to hard flow, and makes some magnetic disks rush into supplies-of-provisions opening of a camera with the above. Therefore, a magnetic disk can be extracted with a finger.
[0006]
[Problem(s) to be Solved by the Invention] There are what carries out discharge actuation automatically by the ejection button operation, and a thing which is interlocked with actuation of ejection ** and made to discharge in manual in the discharge means of a magnetic disk. That is, the automatic discharge means has the composition that ejection actuation makes a magnetic disk discharge automatically [even if a magnetic disk is rotating, after stopping this rotation].
[0007] Moreover, when ejection actuation is performed during rotation of a magnetic disk, after making a manual discharge means suspend rotation, there are a thing of a configuration of making it ejection ** interlocked with and making a magnetic disk discharge and a thing which interlocks the magnetic disk under rotation with actuation of ejection **, and makes it discharge forcibly in it.
[0008] Therefore, when ejection actuation was carried out during rotation of a magnetic disk, VFDD equipped with the manual discharge means which made discharge possible during rotation of a magnetic disk will be discharged in the condition that the frictional force of the force in which it is strong between a motor shaft (turntable) and the hub of a magnetic disk has arisen, and had problems, like the hub of a magnetic disk gets damaged.
[0009] Although brakes were applied to the motor by ejection actuation with this kind of discharge means, the configuration was complicated, or the braking time was prolonged by the fall of supply

voltage, and there was a problem which must be solved from the reason nil why sufficient effectiveness is not expectable etc. This invention aims at developing an information record regenerative apparatus equipped with the manual discharge means of the record medium which solved the possible problem which restricted, detected early, and described it above on the motor as the brake was slammed for ejection actuation in view of such the actual condition.

[0010]

[Means for Solving the Problem] In the information record regenerative apparatus equipped with the mechanical discharge device in which record media, such as a magnetic disk recorded or played in the stowed position, are made to discharge by ejection actuation as the 1st invention in this invention in order to attain the above-mentioned purpose A control means to input the pulse driving signal which carried out Pulse Density Modulation to the motor drive circuit turning around a record medium according to FG signal, and to carry out forward rotation of the record medium, A brake means to make an inversion signal input into the above-mentioned motor drive circuit while making the ejection actuation performed during rotation of a record medium follow and regulating the above-mentioned pulse driving signal to fixed pulse width, Detect the rotational speed of a record medium from FG signal, and an inversion signal is made to continue till the 1st moderation point in time defined beforehand. The information record regenerative apparatus characterized by having the brake control means which makes an inversion signal intermittent by the progress at the 1st moderation time, and stops the input of this inversion signal with a pulse driving signal after that is proposed.

[0011] As the 2nd invention, supply voltage level is detected, it ****s in this disregard level, the pulse width of a pulse driving signal is regulated, and it has the composition of having formed an adjustment means to adjust so that a braking time may become the shortest in the above-mentioned information record regenerative apparatus.

[0012]

[Function] If ejection actuation is carried out while rotation of a record medium has stopped, discharge of a record medium will be performed by the discharge device interlocked with this ejection actuation. A pulse driving signal is regulated by fixed pulse width by ejection actuation, and an inversion signal inputs into a motor drive circuit, and it moves to a brake operation of a motor. In order that an inversion signal may input continuously until a record medium reaches at the moderation time of ** the 1st defined beforehand, the inversion torque of a motor acts greatly and a brake force acts strongly.

[0013] Progress of the moderation time of ** a 1st advances a brake operation by the inversion torque to which the inversion signal was intermittent and the motor was intermittent. It is stood still by stopping both the inputs of a pulse driving signal and an inversion signal, and stopping electric supply of a motor by progress of subsequent predetermined time, without a record medium overrunning. Thus, in order that a record medium may carry out a quick stop, it is satisfactory especially also when discharged during rotation of a record medium.

[0014] Moreover, when supply voltage is descending, the pulse width of a pulse driving signal is regulated according to this voltage level. That is, when supply voltage level is high, pulse width is narrowed, and since a pulse driving signal is regulated so that pulse width may be made large when this voltage level is low, it becomes the braking time of the ultrashort time amount which is unrelated to fluctuation of supply voltage.

[0015]

[Example] Next, this invention is explained along with a drawing about an example carried out as VFDD of an electronic "still" camera. Drawing 1 is the block diagram showing the electrical circuit of VFDD, and the motor drive circuit of the spindle motor which 11 rotates a magnetic disk and 12 makes rotate a magnetic disk 11, and 13 are the motor drive circuits of the stepping motor to which the magnetic head 14 is moved.

[0016] Moreover, 15 is a waveform shaping circuit, and shapes in waveform and outputs PG signal which the PG (pulse charging dynamo) coil 16 which detects an image phase generates, and FG (Phi-DOBAKKU charging dynamo) signal which returns the rotational-speed signal of a magnetic disk 11. 17 is a digital disposal circuit which sends the picture signal which inputted the picture signal which a

solid state image sensor outputs, carried out signal processing and processed this picture signal so that it might be suitable for magnetic recording to the magnetic head 14.
[0017] 18 is a controller containing CPU, RAM, etc., it inputs PG signal and FG signal, carries out a signal operation, and outputs the control signal of the motor drive circuits 12 and 13 and digital-disposal-circuit 17 grade. That is, the PWM signal (pulse driving signal) which carried out Pulse Density Modulation based on FG signal is made to input into the motor drive circuit 12, and it is made to carry out forward rotation of the spindle motor with the rotational speed according to the pulse width.
[0018] Moreover, this controller 18 makes an inversion signal (REV signal) input into the motor drive circuit 12, when ejection actuation is carried out during the output of an PWM signal, i.e., rotation of a magnetic disk 11. In addition, to the motor drive circuit 13, a control signal (CON signal) is outputted for a head driving pulse signal (HED signal) to a digital disposal circuit 17.
[0019] The above-mentioned REV signal is explained with reference to drawing 2 . If ejection actuation is performed while the magnetic disk 11 is rotating, a REV signal will be outputted while a controller 18 regulates an PWM signal to the fixed pulse width judged from the input state of FG signal.
[0020] And although this controller 18 makes a REV signal continue until the pulse period Tg of FG signal reaches the pulse period T1 defined beforehand, when the pulse period Tg becomes larger than T1, synchronize it on each ** of FG signal, it makes a REV signal turn off temporarily, and comes to make a REV signal intermittent. Furthermore, an PWM signal is also made to turn off, when the pulse period Tg becomes larger than the pulse period T2 defined beforehand at the same time it makes a REV signal turn off.
[0021] Furthermore, form the ejection switch 19 and the discharge pilot switch 20 of a magnetic disk 11 in above VFDD, it is made to input into a controller 18 the Low signal generated by closing actuation of these switches 19 and 20 as an ejection signal (EJC signal) and a discharge signal (DIS signal), and this controller 18 performs decision of ejection and discharge to it.
[0022] The ejection switch 19 is the switch of the normally open form which closes by sliding actuation of ejection ** 21, and outputs an EJC signal, as shown in drawing 3 (A). Moreover, ejection ** 21 closes the ejection switch 19 to the timing shown in drawing 3 (B). That is, if sliding actuation of ejection ** 21 is carried out from an illustration continuous-line location, a magnetic disk 11 will start discharge according to the mechanical discharge device interlocked with this ejection ** 21.
[0023] And when sliding actuation of ejection ** 21 is carried out to the location of illustration 2 dotted-line 21a, a magnetic disk 11 is discharged by the ejection switch's 19 closing and carrying out sliding actuation to the location of illustration two-dot chain line 21b. In addition, when a magnetic disk 11 is discharged, the discharge pilot switch 20 closes and a DIS signal is outputted.
[0024] Next, the above-mentioned actuation of VFDD is explained. By making a camera contain a magnetic disk 11, this disk 11 is set to VFDD like the conventional example. And by carrying out release of the camera, an PWM signal is sent to the motor drive circuit 12 from a controller 18, and a magnetic disk 11 rotates by rotation of a spindle motor. Moreover, the picture signal outputted from the solid state image sensor inputs into a digital disposal circuit 17, and the picture signal by which signal processing was carried out is sent to the magnetic head 14, and is recorded on a magnetic disk 11.
[0025] Sliding actuation is carried out and the magnetic disk which record finished makes ejection ** 21 discharge. And if rotation of a magnetic disk 11 has stopped at the time of actuation of ejection ** 21, a magnetic disk 11 will be discharged by the discharge device interlocked with sliding **** of ejection ** 21.
[0026] While the magnetic disk 11 is rotating, when sliding actuation of ejection ** 21 is carried out, the brake is slammed to rotation of a magnetic disk 11, and a magnetic disk 11 is made to discharge in connection with this brake.
[0027] It explains referring to the timing diagram of drawing 4 about the brake actuation in this case. If ejection ** 21 slides while the magnetic disk 11 is rotating, a controller 18 will input the EJC signal by closing of the ejection switch 19, and an PWM signal will be regulated from t0 to the signal of fixed pulse width at this time, and a REV signal will be outputted, and it will send to the motor drive circuit 12.

[0028] For this reason, brakes are applied to a spindle motor, rotation of a magnetic disk 11 begins moderation and the pulse period Tg of FG signal becomes large gradually. Since rotation of a magnetic disk 11 serves as Tg>T1 by amounting to t1 at the moderation time of ** a 1st, as already explained, a controller 18 operates so that a REV signal may turn off temporarily for every stand going up of FG signal.
[0029] Moderation of a magnetic disk 11 progresses further in the above-mentioned brake actuation, and the pulse period Tg of FG signal is expanded further. And when rotation of a magnetic disk 11 amounts to t2 at the moderation time of ** a 2nd, a controller 18 judges the conditions of Tg>T2 and suspends the output of an PWM signal and a REV signal.
[0030] From this, a stepping motor is no supplying electric power, and a magnetic disk 11 stands it still by halt of this motor. With such a brake, a magnetic disk 11 is interlocked with sliding actuation of ejection ** 21, and is discharged.
[0031] Moreover, when a magnetic disk 11 is discharged, the discharge pilot switch 20 carries out closing actuation, and inputs a DIS signal into a controller 18. or the controller 18 was late operated [whether ejection ** 21 was operated early or] by the input of this DIS signal -- that is, the magnetic disk 11 -- base -- it judges whether it was discharged quickly or it was discharged slowly, and an PWM signal and REV signal's output halt time is determined.
[0032] drawing 5 is the same timing diagram as drawing 4 which showed the case where ejection ** 21 was operated slowly, it was usually alike, and the brake worked. In this case, it becomes the brake actuation which the magnetic disk 11 was suspended by the relation in which a braking time TBK serves as TBK<=TM<TS, and the output of an PWM signal and a REV signal was suspended by t2 (drawing 4) at the moderation time of ** a 2nd, and was explained by drawing 4 . In addition, time amount after the ejection switch 19 carries out closing actuation of TS until the discharge pilot switch 20 carries out closing actuation, and TM are the count time amount of a timer prepared in the controller 18.
[0033] drawing 6 -- ejection ** 21 -- base -- it is a timing diagram at the time of being operated quickly, and regardless of whether since it became TBK**TS<TM at this time, the magnetic disk 11 amounted to t2 (drawing 4) at the moderation time of ** a 2nd, it is the discharge pilot switch 20 at the closing actuation time, and the output of an PWM signal and a REV signal stops.
[0034] Ejection ** 21 is operated slowly and drawing 7 shows a timing diagram in case a magnetic disk 11 does not slow down easily. In this case, since it becomes TBK**TM<TS, the timer of the controller 18 formed as a safety practice operates, it is at the progress time of the count time amount TM of a timer, and the output of an PWM signal and a REV signal is suspended.
[0035] In VFDD of the above-mentioned example, a braking time will become long if a braking time changes a little, a braking time becomes early when supply voltage level is high, and this voltage level goes down by the voltage variation of supply voltage Vbb. However, since it is necessary to slam the brake, it is desirable to carry out brake actuation between the fixed ultrashort time amount irrespective of fluctuation of supply voltage.
[0036] In order that it may solve this point, regardless of fluctuation of supply voltage, drawing 8 is the example constituted so that a braking time might be made regularity, makes the detecting signal (BS signal) of the supply voltage Vbb detected by the potentiometer 22 at the time of sliding actuation of ejection ** 21 input into a controller 18, and has composition calculated so that this controller 18 may change the pulse width of an PWM signal with this BS signal. Others are the same as that of the block diagram shown in drawing 1 .
[0037] In this example, as shown in drawing 9 as an example, 7 volts of 9 volts or more of 8-9 volts of 7-8 volts of supply voltage level are divided as follows, and the pulse width of an PWM signal is changed. In addition, the modulation of this pulse width has composition performed after a controller 18 inputs an EJC signal.
[0038] thus, since the motor drive circuit 12 will apply brakes so that it may become fixed inversion torque even if supply voltage level is high and it is low if constituted, it becomes the braking time of about 1 law that it is hardly influenced by fluctuation of supply voltage.
[0039] As mentioned above, although the example about the information record regenerative apparatus

which used the magnetic disk as the record medium was explained, it can carry out similarly about the information record regenerative apparatus which used the optical disk etc. as the record medium.
[0040]
[Effect of the Invention] Since it is discharged according to this invention, the brake being effectively slammed to rotation of a record medium, and fully slowing down by this brake when being discharged while a record medium rotates as described above, a magnetic disk is discharged smoothly and it becomes an information record regenerative apparatus without problems, like a blemish is attached to that hub etc. Moreover, since a braking time is not influenced by fluctuation of supply voltage, a braking time becomes long by descent of supply voltage, and the information record regenerative apparatus of this invention does not have the problem that the brake does not fully work.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram of an electrical circuit showing an example which carried out this invention as VFDD of an electronic "still" camera.
[Drawing 2] It is the timing diagram which showed the relation of the FG signal and the REV signal which are generated in a brake process.
[Drawing 3] Drawing 3 (A) is the simplified schematic having shown ejection ** and an ejection switch. Drawing 3 (B) is the explanatory view having shown the relation of the sliding actuated valve position of ejection **, a magnetic-disk discharge process, an EJC signal, and a DIS signal.
[Drawing 4] It is the timing diagram which shows the above-mentioned brake actuation of VFDD.
[Drawing 5] It is the timing diagram which shows brake actuation when ejection ** is operated slowly.
[Drawing 6] ejection ** -- base -- it is the timing diagram which shows the brake actuation when being operated quickly.
[Drawing 7] It is the timing diagram which shows brake actuation in case ejection ** is operated slowly and a braking time is prolonged.
[Drawing 8] It is the same block diagram as drawing 1 showing an example of VFDD constituted so that brake actuation might be carried out without being influenced by fluctuation of supply voltage.
[Drawing 9] In brake actuation, it is the pulse-shape Fig. showing an example of an PWM signal to which pulse width was changed according to supply voltage level.
[Description of Notations]
11 Magnetic Disk
12 Motor Drive Circuit
13 Motor Drive Circuit
14 Magnetic Head
15 Waveform Shaping Circuit
16 PG Coil
17 Digital Disposal Circuit
18 Controller
19 Ejection Switch
20 Discharge Pilot Switch
21 Ejection **
22 Potentiometer

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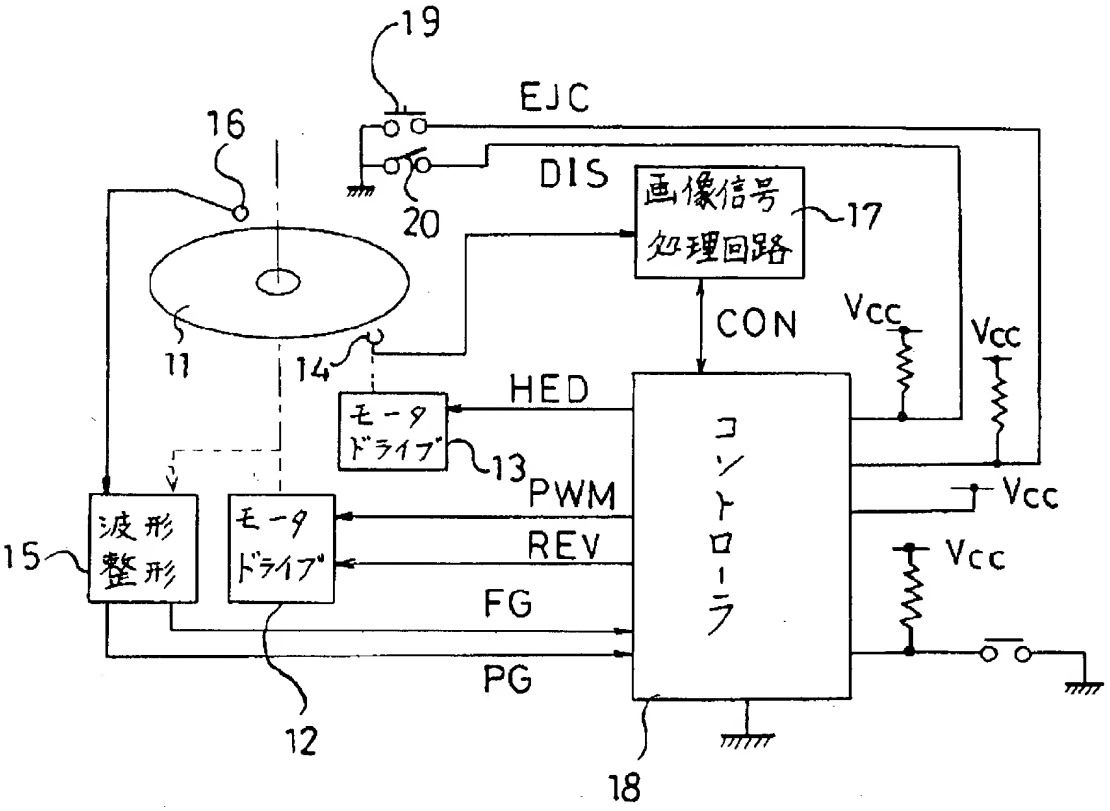
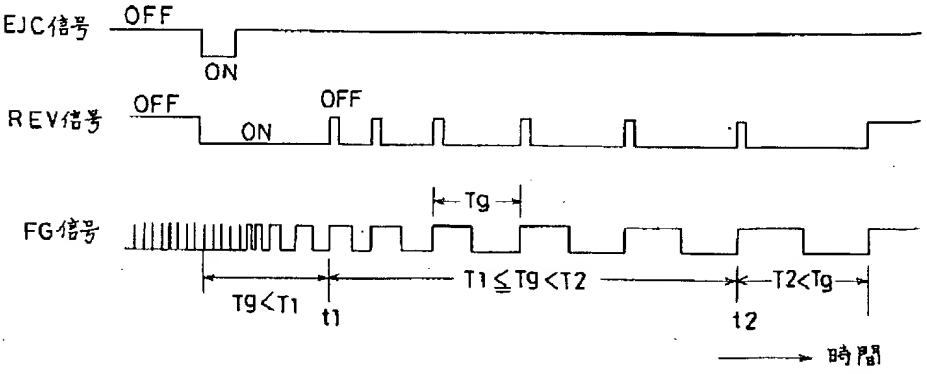
DRAWINGS

[Drawing 1]



[Drawing 2]



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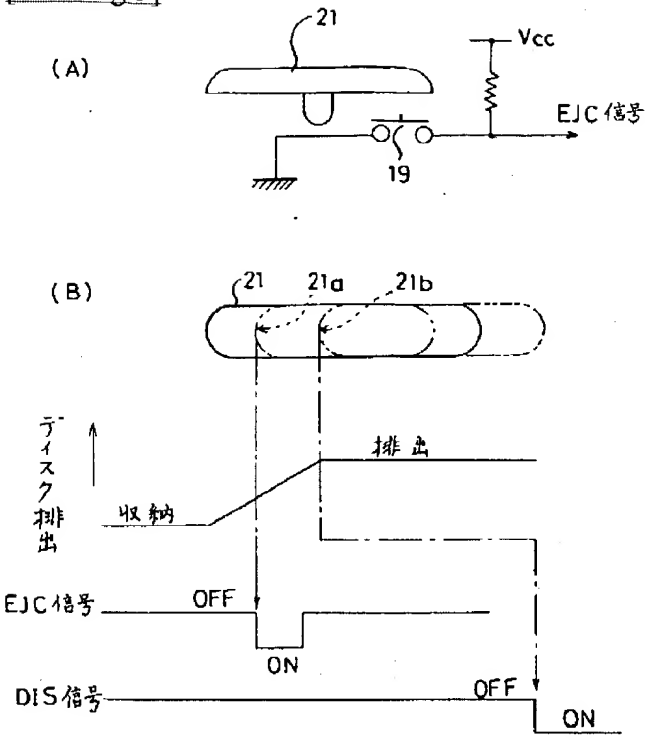

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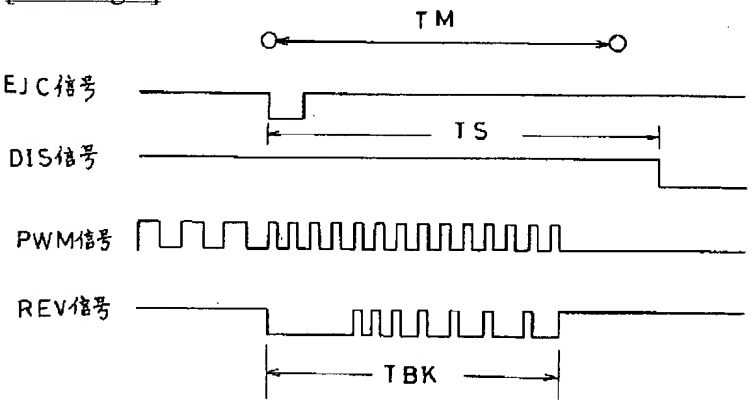

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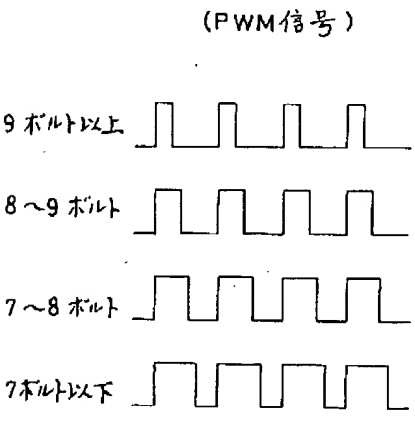
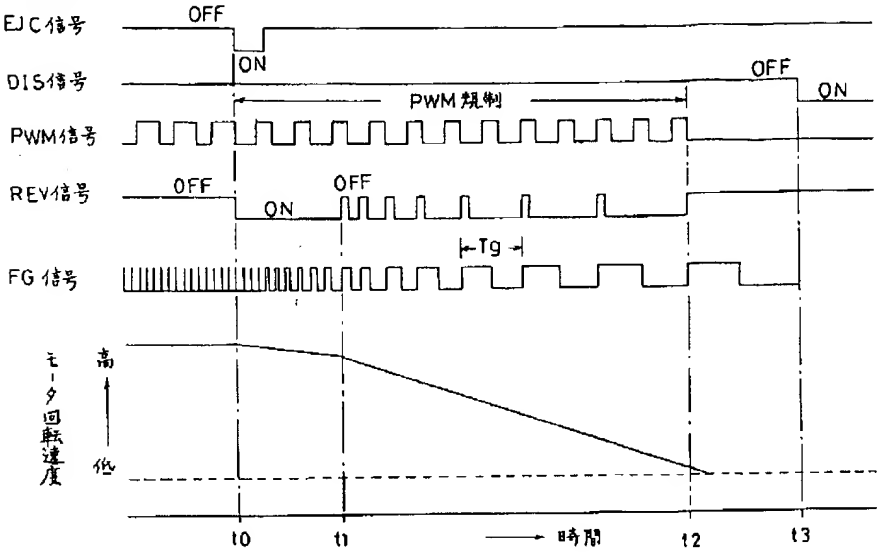
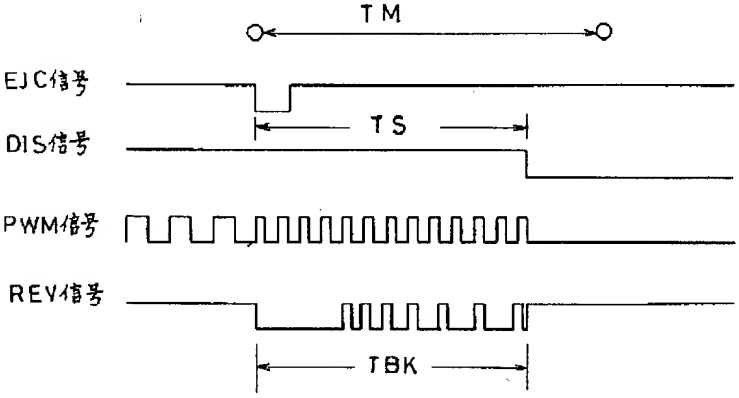


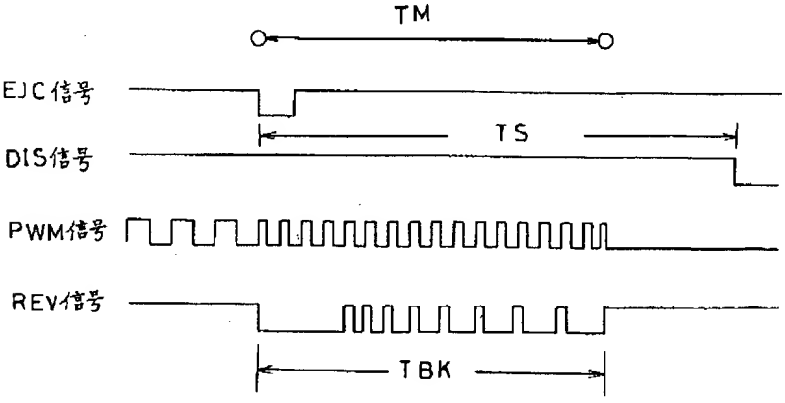
[Drawing 4]



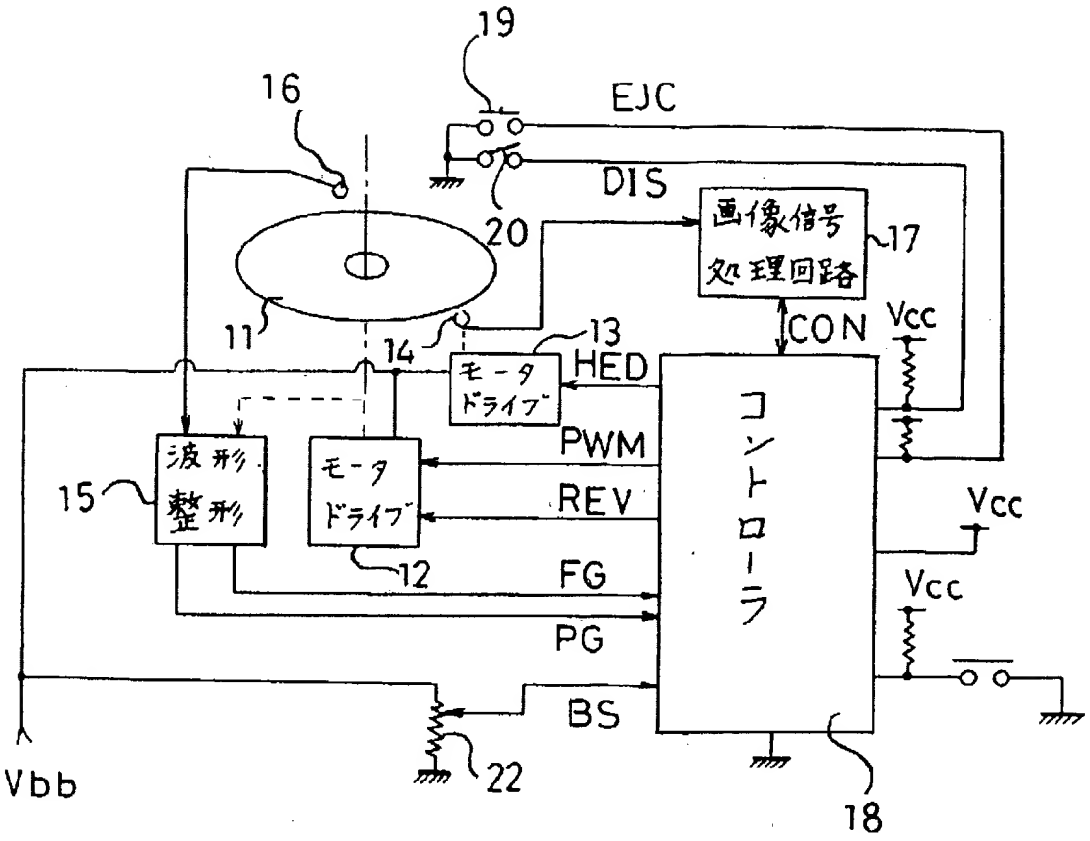
[Drawing 6]



[Drawing 7]



[Drawing 8]



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